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**NOTES ON THE SYSTEMATICS AND DULOSIS OF SOME WESTERN
SPECIES OF FORMICA, SUBGENUS RAPTIFORMICA**

(HYMENOPTERA: FORMICIDAE)

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NOTES ON THE SYSTEMATICS AND DULOSIS OF SOME WESTERN
SPECIES OF FORMICA, SUBGENUS RAPTIFORMICA
(HYMENOPTERA: FORMICIDAE)

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ABSTRACT—*Formica parvipappa* Cole is placed in the synonymy of *F. curiosa* Creighton. The morphological variation, distribution and known habits of this species are discussed; *F. manni* Wheeler is recorded as a slave of this species in Oregon. *Formica bradleyi* Wheeler is noted to function as a slave to *F. puberula* Emery in Colorado. Brief comment is made on the status of *Raptiformica* as a subgenus.

Recent years have seen numerous changes proposed in the status of our western ants assigned by Creighton (1950) to the subgenus *Raptiformica* Forel. Wilson and Brown (1955) synonymized many of the specific and subspecific names; the subgeneric name itself they sank as a synonym of *Formica* L., s. str. A number of species formerly included in *Raptiformica* were also shown to be unrelated to those species which comprised *Raptiformica*, s. str. Gregg (1963) reinstated the subgenus as constituted by Creighton, but advanced little objective evidence for so doing. Finally Buren (1968) reinvestigated the entire problem and proposed a new arrangement of the names involved. This objective, and very thorough, study has embodied some concepts from the work of Wilson and Brown and some from Gregg.

The subgenus *Raptiformica* was reinstated to include ten species which are obviously closely allied to the type species of *Raptiformica*; several of these were resurrected from the synonymy proposed by Wilson and Brown and one new species was described. The species which Wilson and Brown had excluded were left in *Formica*, s. str. A revised key to the species of *Raptiformica* was provided and the synonymy and morphological characters of each species were discussed. Buren's effort seems the best answer yet proposed in this particularly vexatious group of ants. I believe, however, that he overlooked one case of synonymy, but merely because the names involved are known from very few specimens.

***Formica (Raptiformica) curiosa* Creighton**

Formica curiosa Creighton, 1935, Amer. Mus. Novit. 773: 5-8. ♂ ♀.

Formica parvipappa Cole, 1946, Ann. Ent. Soc. Amer. 39:616-618. ♂. New synonymy.

Formica (Raptiformica) curiosa: Creighton, 1950, Bull. Mus. Comp. Zool. 104: 464; Buren, 1968, Jour. Georgia Ent. Soc. 3: 32-33.

Formica (Raptiformica) parvipappa: Creighton, 1950, Bull. Mus. Comp. Zool. 104: 467; Buren, 1968, Jour. Georgia Ent. Soc. 3: 33.

Formica curiosa: Wilson and Brown, 1955, Psyche 62: 123 (in part).

Formica parcipappa: Wilson and Brown, 1955, Psyche 62: 125.

On June 10, 1967, collecting on an alkali flat at the western edge of the Harney Lake basin, 44.2 miles southwest of Burns, Harney County, Oregon, I had the good fortune to take a colony of a unicolorous reddish *Raptiformica* together with its host species. The host proved to be *Formica* (*F.*) *manni* Wheeler, an especially common species in that area. The identity of the dulotic species was not so easily attained, for in Creighton's key (1950) and in Buren's key (1968) some individuals ran to *F.* (*R.*) *parcipappa* Cole and others to *F.* (*R.*) *curiosa* Creighton, although the majority of specimens seemed to better fit the description of Cole's species, described from Nampa, Idaho. In both of these keys the separating character was the concolorous body of *F. parcipappa* versus the bicolored condition of *F. curiosa* in which the gaster is darker than the head and alitrunk.

Buren noted what seemed to be better features in his discussions of these species, especially in the shape of the petiole. That of *F. parcipappa* was said to be rather broadly fan-shaped when viewed from behind, and the crest with a sharp edge which has a distinct median notch. The worker of *F. curiosa* was noted to possess a narrowly fan-shaped petiole, its crest moderately sharp and without a median notch. Some of my specimens from Oregon have the petiole rather narrow, with its sides only moderately convergent toward the base, very similar to the condition seen in paratypes of *F. curiosa* which I have examined. In these specimens the crest, when viewed from behind, is usually gently and evenly convex from side to side, without a trace of a median notch. In a few specimens the crest is much the same, but with a slight sinuation in the middle. One specimen, which has the least fan-shaped petiole of those in my series, has a very distinct median notch. From the narrowly fan-shaped petiole without a notch (as in *F. curiosa*) my series runs the full gamut to the broader, notched petiolar condition typical of *F. parcipappa*. It should be pointed out that some of the broad petiole specimens also lack the median notch. I think it is safe to state that the petiolar difference noted by Buren is of no significance in separating *F. parcipappa* from *F. curiosa*.

According to Buren, also, the scapes of *F. parcipappa* were equal to or slightly longer than the maximum head length, while they are shorter than the head length of *F. curiosa*. The one paratype of *F. parcipappa* in my possession has the scape distinctly shorter than the length of the head, and this condition prevails among my Oregon specimens. In only a few are the scapes as long as the head length; none which I have examined for this character have longer scapes.

Because my specimens completely bridge the gap separating *F. paricipappa* and *F. curiosa* I think it necessary to place *F. paricipappa* in the synonymy of *F. curiosa*.

Little is known of the habits of this species. The type series of *F. curiosa* was taken by Creighton at Lake McGregor, Montana, the nest in sandy soil under a small stone in open pine woods near the edge of the lake. Cole's name was based on sixteen foraging workers in a greasewood-shadscale habitat; the nest was not located. The Oregon colony which I collected was located in fine sand forming a hummock around a cluster of greasewood shrubs, on an alkali flat. Three other ant species were common in this microhabitat: *Manica mutica* (Emery), *Pogonomyrmex owyheeii* Cole and *F. (F.) manni*. The colony was discovered late in the afternoon; workers of *F. manni* were active outside the nest, but no individuals of *F. curiosa* were seen until the colony was exposed. Both species in this compound nest were timid when the nest was opened, and actively gathered brood up and carried it out of sight.

Few larvae, and no pupae, were in evidence, although the nest apparently was thoroughly excavated. The total population collected consisted of one gravid female, 21 ergatogynes, 182 workers of *F. curiosa* and 45 workers of *F. manni*. However, at least as many workers of the host species were ignored in my effort to secure as many specimens as possible of the slave-maker. Creighton recorded *F. lasioides* Emery as the host of the colony which he collected in Montana. That species, although present in the area of the Oregon site, was not found in the immediate vicinity.

***Formica (Raptiformica) puberula* Emery**

Formica sanguinea puberula Emery, 1893, Zool. Jahrb. Syst. 7: 648; Wheeler, 1913, Bull. Mus. Comp. Zool. 53: 413.

Formica (Raptiformica) puberula: Creighton, 1950, Bull. Mus. Comp. Zool. 104: 468; Gregg, 1963, Univ. Colo. Press, Boulder, p. 613-616; Buren, 1968, Jour. Georgia Ent. Soc. 3: 30-31.

Formica subintegra: Wilson and Brown, 1955, Psyche, 62: 120-123 (in part).

While collecting in eastern Colorado I devoted some time to an area of grassland and sandhills south of Limon, Lincoln County. Here I found one mixed colony in which the slave species was *F. (F.) bradleyi* Wheeler and the dulotic species was *F. (Raptiformica) puberula* Emery. This evidently is the first record of *F. bradleyi* serving as a slave-species.

Both *F. manni* and *F. bradleyi* had formerly been included in the subgenus *Raptiformica*, but were removed, along with other species, to *Formica*, s. str., by Wilson and Brown. Gregg returned them to *Raptiformica* but Buren again excluded them. With these species excluded the subgenus *Raptiformica* could then be adequately char-

acterized on morphological and behavioral characters. The behavioral distinction between *Raptiformica* and such species as *F. manni*, *F. bradleyi* and their relatives have not been emphasized to the fullest extent. *Raptiformica*, as interpreted and characterized by Buren, contains only dulotic species. Those species which have been excluded from *Raptiformica* do not, so far as currently available data would indicate, ever take other species as slaves. Indeed, two of these excluded species may function as slaves to *Raptiformica*. I believe that this still further justifies the exclusion of these species from *Raptiformica*.

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